MARINE REVIEW.

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Marine Engineers' Beneficial Association.

With this issue the MARINE REVIEW presents a supplemental engraving, in which are grouped portraits of leading officers in the national association of marine engineers. This organization includes within its membership the great majority of engineers on the lakes and is equally strong on the Atlantic and Pacific coasts. Following is a brief account of the organization by the national secretary:

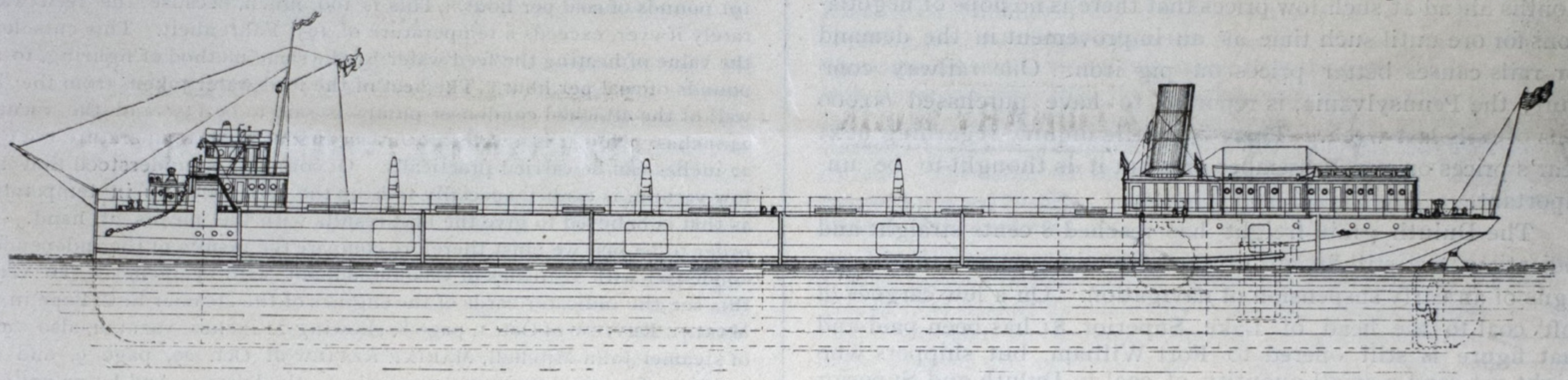
"The national association will meet in its seventeenth session in January, 1892, in the city of Washington, D. C., for the purpose of disposing of such matters as may be brought before it for consideration, and therefore a brief history of the association can not but be interesting to those who have watched its growth and success. James V. Hayes of Buffalo, since deceased, recognizing in 1875 the necessity for greater concert of action and a closer bond of relationship between the engineers of the three great divisions of American commerce, the sea, the lakes and the western rivers, forwarded a circular letter to the several local associations, where any existed, and to some cities, notably St. Louis, where no association existed, calling a convention to be held in the city of Cleveland for the purpose of forming a supreme head.

In response to the letter, Garret Douw and James V. Hayes of Buffalo, R. Doty, William Kennedy aud James L. Lord of Cleveland, Thomas Buchanan of Detroit, J. W. Shea of St. Louis, A. L. Foote and William Shaffer of Baltimore and William Punsonby of Chicago, met in the city of Cleveland on Feb. 21, 1875, and formed the national association, adopting a constitution, formulating secret work, such as signs, pass-words, etc., and clothing each of the representatives present with authority to return to his home and institute subordinate associations. The officers chosen at the first session were Garret Douw, national president; A. L. Foot, first national vice-president; J. W. Shea, second national vice-president; Thomas Buchanan, national secretary; R. Doty, national treasurer. The last named gentleman held his office continuously until 1886, when he was succeeded by John H. Galwey, the present national president.

At the fourth session, held in Chicago in 1878, the office of second vice-president was abolished, and at the tenth session held in 1885, the office of past national president was created, William E. Russell of Pittsburgh being the first gentleman to hold that position of honor, he having been national president the year previous. Of the founders of the order, Garret Douw and James V. Hayes are deceased, both gentlemen dying in Buffalo in 1885. At the subsequent convention, which met in Buffalo in 1886, appropriate and extended memorial services were held in honor of the memory of these distinguished members, to whom the order was greatly indebted for its existence. Both of the gentlemen were well known upon the lakes, Mr. Douw being one of the best known engineers of his day. Just previous to his death, however, he had been in retirement for some time, as he was an invalid. Twelve different men have held the position of president in the national association. They were: Garret Douw, A. L. Foote, Thomas H. Nelson, Edward D. Bateman, James H. Reid, William E. Russell, Andrew Ritter, Henry G. Payne, Aspinwall Fuller, A. R. Young, A. L. Boyes and John H. Galwey. A. L. Foote was national president for four years, and although Aspinwall Fuller was re-elected for the second term he resigned the office a few months later and A. R. Young, the national vice-president, succeeded him, appointing George P. Wilson to the position of national vice-president. The latter gentleman presided throughout the entire meeting of the fourteenth session, Mr. Young being unavoidably detained from attending the meeting, and it was in recognition of this service that the national association conferred upon Mr. Wilson the title and honor of past national president. Four of the gentlemen named above as having presided over the national association are now dead. They are Messrs. Douw, Russell, Fuller and Reid.

The engineers of the country are looking forward with interest to the forthcomiug convention, which will undoubtedly be one of the most important ever held. Owing to the growth and magnitude of the order, the national association concluded about two years ago that the duties of the national president were such that no man could attend to it and engage in any other business. With that end in view the office was made a salaried one, and Mr. John H. Galwey, the present incumbent, who is serving his second term, was selected as the man to fill the position."

JAS. HENRY HARRIS.



PLAN OF NEW ANCHOR LINE STEAMERS.

Three Anchor Line Steamers.

A view of the style of boat for which the Anchor Line has let contracts with the Union Dry Dock Company of Buffalo, Globe Iron Works Company of Cleveland and Detroit Dry Dock Company of Detroit is presented on this page. The engraving is made from drawings kindly furnished by Supt. Edward Gaskin of the Union Dry Dock Company and is correct with the exception that according to a late change in arrangements above deck, the forward house will be moved aft about 20 or 30 feet, leaving the space forward for anchors, capstan, etc.

A new feature in the boats, which are to be duplicates in all respects, with the exception of probably a slight difference in the proportion of engines, is the absence of sheer in their con-

struction. They will be built without any sheer, that is they will be the same depth at ends as in the middle and the gunwale will be a bevel line. In this there is said to be a saving of $12,000 to $15,000 on boats of this class. The boats are to be 275 feet keel, 40 feet beam and 26 feet depth from base line to top of spar deck beams at side. The boats to be built by the Globe company, of Cleveland and the Detroit Dry Dock Company will be engined by these companies, but H. G. Trout & Co. of Buffalo will build the engines for the steamer to be built by the Union Dry Dock Company, and the Lake Erie Boiler Works, also of Buffalo, will build the boilers. The engines to be built by Trout will be 20, 33 and 54 inches by 45 inches stroke. The two boilers will be 12 feet long and 14 feet diameter, to be allowed 160 pounds of steam. The boats will have steam capstans, windlasses, steerers and line shafting for hoisting purposes, together with electric lighting plants and all modern arrangements for rapid work in port. They are expected to carry 2,700 tons of freight on 15½ feet of water and their cost is given out at $178,000 each.

Iron Market and the Freight SItuation.

A rumor current during the week was to the effect that some ore had been sold for delivery next year and the representatives of the Iron Belt company were among those who were said to have made sales. The reports are authoritively denied, however, and it is certain that no sales have been made. Advices to ore dealers show that the accumulations of pig iron, notwithstanning the heavy manufacture of it, are insignificent, but furnace men are compelled to make sales even several months ahead at such low prices that there is no hope of negotiations for ore until such time as an improvement in the demand for rails causes better prices on pig iron. One railway company, the Pennsylvania, is reported to have purchased 60,000 tons of rails last week. There is a little inquiry regarding next year's prices on non-Bessember ores but it is thought to be unmportant.

The Duluth grain freight has reached 8 cents straight and indications are still in an upward direction, on account of the signs of an early suspension of navigation. On a few cargoes of soft coal to the head of Lake Superior $1 has been paid and that figure is still offered to Fort William, but shippers who might yet send a small quantity of coal to Duluth and Superior are now trying to get tonnage at 65 cents. On one load to Milwankee a rate of $1.25 was secured Tuesday. Ore rates are $1.40 from Marquette and $1.30 from Escanaba. Ore shipments from the head of Lake Superior are at an end. Lumber from Bay City to Cleveland is paying $2.25. The rate to Tonawanda is the same.

Lloyd's Agents.

Some time ago it was announced that the committee of Lloyd's in charge of the appointment of agents would receive applications for the establishment of agencies in Cleveland and Detroit. The editor of Fairplay of London in a letter to the REVIEW regarding this matter, says: "The only applicant for Cleveland, O., was J. R. Oldham, and the only applicant for Detroit, Mich., was W. M. Daly. The committee of Lloyd's will sit on these applications on Nov. 18, and as only one person has applied for each post, the probability is that both will be elected. The duties of Lloyd's agents are, mainly, to post shipping advices regularly to Lloyd's here, also to intervene in the interest of underwriters in, and connected with Lloyd's in any cases of casualty where the underwriters are affected. Captains of British ships usually consult the nearest Lloyd's agent whenever they get into trouble of any kind with their ships, and the duty of the agent is to protect them by giving them such advice as may facilitate their getting through the trouble on hand. The post of Lloyd's agent is very much sought after all over the world, and the position is a very prominent, responsible and honorable one, and though in most cases no salaries goes with the appointment, the connection with Lloyd's is probably directly, and certainly indirectly, a very valuable thing to possess."

Value of Independent Condensers.

EDITOR MARINE REVIEW: The writer of the article on the "Value of Independent Condensers" in your issue of Oct. 29, no doubt intended to make a fair exposition of the case, but it is evident that his data was unfortunately gathered under circumstances that were not normal, because they do not agree with the actual practice. If he will correct errors and misstatements, he will make a very good showing indeed for the independent condenser on the score of economy. Let him first deduct 20 per cent. of the power, (17 horse power) estimated by him as required to run the independent condenser pumps. He bases his figures on twenty revolutions per minute of each side of the pump, while sixteen revolutions is ample to do the work, and furthermore is common practice. Both the Saranac and Tuscarora, fitted with the independent condensers, and having about the size spoken of, run with about that number of revolutions, while the Emily P. Weed in all respects the same, made her last trip with the condenser pump running only thirteen revolntions per minute on each side. Therefore deduct 3.40 horse power on this item. Then deduct 5.50 horse power for one feed pump. The writer of the article referred to says there are two feed pumps requiring 11 horse power, while in fact only one pump is required to supply the boilers, although there may be two pumps in the particular boat he refers to. If 11 horse power were required to supply the feed water to the boilers, the water rate of the engines would necessarily then be nearly double the amount he allows them, which is manifestly wrong. The 4 horse power charged to operate the bilge and cooler pumps is considerably in excess when we consider the mere nominal work that these pumps have to do, and certainly 1 horse power is ample. This makes a deduction of 3 horse power on this particular item, which is certainly fair. The total deduction on the condenser pump, boiler feed pump, bilge and cooler pumps amounts to 11.9 horse power, or say in round numbers 12 horse power, which subtracted from 32 horse power leaves 20 horse power as the actual power required to operate all the pumps. This would take, at his estimate of 10 pounds of coal per horse power per hour, 200 pounds of coal instead of 320 pounds of coal per hour. He credits a gain due to heating the feed water equal to 191 pounds of coal per hour. This is too much, because the feed water rarely if ever, exceeds a temperature of 195° Fahrenheit. This cuts down the value of heating the feed water by the same method of figuring, to 150 pounds of coal per hour. The heat of the feed water taken from the hot well of the attached condenser pumps is said to be 135° and the vacuum 24 inches. Now it is a well known fact that at that temperature not over 22 inches can be carried practically. Of course it is understood that this low vacuum is carried specially to keep the feed water up in temperature as that is believed to give the best results with the means at hand. In order to be just we must therefore compare the results of the independent condenser with 22 inches of vacuum and not with 24 inches. To verify this see the indicator cards of the engines of the steamer E. C. Pope in the MARINE REVIEW of Oct. 1, page 8, showing 22 inches vacuum, also cards of steamer John Mitchell, MARINE REVIEW of Oct. 29, page 9, and the practice of marine engineers generally on the lakes. And let us not forget the tendency of attached pumps and condenser to show even lower than 22 inches when crowded a little. The Weed, Saranac and Tuscarora have Worthington independent condensers and can carry 26 inches or over, but to be within bounds say 26 inches and allow the use of attached condenser at 22 inches. This leaves 4 inches of vacuum to the credit of the independent condenser, which is fair because it is true. Now, on the engine in question this would equal 118 horse power, (if 26 inches equal 59 horse power) at normal number of revolutions, but the value of which is to be increased (not diminished) when the engine is speeded. Add to this his estimate of 25 horse power of which the engine is relieved when the vacuum is made by an independent condenser, (it should be 40 horse power at least) making 143 horse power to the credit of the independent condenser. Now at his estimate of 1.75 pounds of coal per horse power per hour, this 143 horse power, saved by the independent condenser, would represent 250 pounds of coal per hour. Add this to the value of heating the feed water, equal to 150 pounds per hour, and we have 400 pounds per hour to the credit of the independent condenser. From this deduct 200 pounds, which is the coal required to operate all the pumps, leaving 200 pounds coal per hour saved by the independent condenser, which is equal to the cost of about 115 horse power, or nearly 8 per cent. of the power of the main engines. The other admitted advantages of independent condensers, and the important items of reliability, absolute safety and the durability of the valves, that pertain to the use of the simple duplex pump, show plainly the superiority of this method of condensation.

In reply to the question "Why if the independent condenser possesses such advantages, are so many of our lake carriers using connected pumps?" it can be said that there are now more than forty lake vessels fitted with them, many of the very best recent constructions have adopted them and the coming season will witness considerable addition to the number in use. Another answer would be the well known conservatism of marine men as to changes and improvements. The writer remembers the long struggle the compound engine had before its introduction by lake men, and there are yet a few who say single cylinder engines with a condenser are good enough for them.

Buffalo, N. Y., Nov. 11. J. L. ALBERGER.

CHICAGO LAKE INTERESTS.

WESTERN OFFICE, MARINE REVIEW,
No. 210 So. Water Street, CHICAGO, Ill., Nov. 19.

Capt. Marshall, United States engineer, has been quietly pursuing his investigations in the complaint of the marine interests against the Fort Wayne railroad bridge. The most important question outside that of deeper waterways on the great lakes has been opened up in the Fort Wayne bridge matter. It is: Shall lake craft conform to the harbors, or shall the harbors conform to the lake craft? I can not see how Capt. Marshall, if he attempts in his report to the secretary of war to cover the real point at issue, can avoid going into the whole question of lake harbors, particularly Chicago river and its adaptability for the new marine. The Fort Wayne railroad bridge, when it was constructed twenty years ago, was no obstruction to navigation. It is now. The bridge has not changed in the slightest, but the lake boats have. Chicago river is now notoriously incapable of accommodating the larger-sized modern steamers. This railroad bridge is no worse than twenty other bridges on the river. The case of one is the case of them all. It will be a most radical proceeding, some say, if the war department steps in and compels the remodeling of Chicago river to fit the immense steamers now afloat on the great lakes. And if this is done, will not the bridges and river again require remodeling when lake boats grow larger? This is a question which must be met some time, and it is hoped that it will be pushed to a final issue in the case now under consideration.

Another important question, not only here but at hundreds of other bridges, is the right of vessels to unload at docks adjacent to bridges, where the boats obstruct navigation by blocking the draws. The rights of property owners to the use of their docks can not be denied by the general government. To do so would be the virtual confiscation of property without recompense. Nor does it seem likely from the present outlook that the general government will order the removal of a center pier of the bridge as an unreasonable obstruction, when the river is unobstructed for the passage of vessels except by the boats lying at adjacent docks in the draws. There is certainly an obstruction to navigation when the channel is completely blocked. But what is the obstruction—the bridge pier or the boat at the dock?

In the Fort Wayne railroad bridge affair, the marine interests ask that the railroad companies remove the center pier and put in a bridge which will leave the center of the river unobstructed. This seems entirely reasonable, but it requires the railroads to buy a large strip of land over which the bridge can swing. There is precedent for this, in the action of the city which has gone to great expense in securing land over which to swing the double track bridges on the south branch. If the Fort Wayne bridge was to be now built and its plans submitted to the war department there is no doubt that the secretary of war would require a single span, leaving the center of the river free for the passage of vessels. He could not consistently with the river and harbor act of September, 1890, permit the building of a bridge which would be an obstruction to navigation. It is difficult to see how in essence the question is different—whether a bridge is to be constructed, or has long been bnilt. When the theory is adopted that age gives a bridge prescriptive right to obstruct navigation, all progress is stopped.

It is essential to the lake marine that all these questions arising over the Fort Wayne railroad bridge should be pushed to a final settlement. It will not be many years before there will be twenty feet of water in the great lakes, and at every port, harbor facilities for the new lake marine which will be called into existence by deeper waterways will conflict with bridges already built.

The deep waterways convention will go before congress asking that millions of money be appropriated for a twenty-foot channel, on the ground that the money thus expended will be returned to the people ten to a hundred fold in cheapened transportation. Cheaper transportation, however, is only to be obtained by vessels carrying larger cargoes by reason of deeper water. If the war department decides that it can not change bridges already constructed, it will be following a principle diametrically opposite. The two branches of the general government will be riding horses going in widely different directions. Congress, as the representative of the people, will be seeking cheaper transportation by increasing the capacity of vessels. The war department will take the ground that lake vessels are large enough, and if they are built larger, they have no right to the use of the navigable waters of the United States.

Milwaukee Dry Dock Interests.

Special Correspondence to the MARINE REVIEW.

MILWAUKEE, Wis., Nov. 19.—The recent consolidation of shipyard interests at this port has carried with it a minor change to which it will for some time be difficult to accustom one's self. It has been customary heretofore, for instance, to speak of the "Milwaukee Company's Yard" and the "Wolf & Davidson Company's Yard." Now they are designated the "Milwaukee Dry Dock Company's West Yard" and the "Milwaukee Dry Dock Company's South Yard." The west yard is under the supervision of William E. Fitzgerald, the secretary and treasurer, and the south yard under the watchful eyes of Capt. Fred. C. Starke, the vice-president of the company, Both are active, energetic, capable young men, well known along the entire chain of lakes. A visit to the south yard found Capt. Starke engaged upon plans which will revolutionize the appearance of that establishment. Work is to be commenced at once upon a large new building, which will comprise a commodious office, storage department and moulding loft. This building is to be located near the north line of the yard, opposite the foot of Mineral street. Other changes to be inaugurated next spring contemplate a centralization of the different buildings for storage and other purposes. A circular just issued states that the active management of the Milwaukee Dry Dock Company will be under the immediate charge of Capt. John Fitzgerald. It also makes a feature of the fact that "Mr. Thomas Davidson, who until eighteen months ago owned a large interest in the business of Wolf & Davidson, is one of the large stockholders and directors in the new company," and that thus "vessel owners will again have the benefit of Mr. Davidson's experience and advice." It may seem a little singular that while Commodore Wolf has sought relief from the worry associated with the management of a shipyard, his former partner, "Honest Tom Davidson," should again see fit to put an iron in the fire. But Mr. Davidson's life seems bound up in the business, and he can only find true happiness in it. His chief source of pleasure since dissolving partnership with Commodore Wolf has been to visit the old stamping ground, and even rainy days have found him there, at times when his health was threatened by the exposure. According to current report Mr. Davidson is a stockholder in the new company to the extent of $30,000 at least.

Local vessel owners and agents are considerably worked up over heavy shortages recently reported on cargoes shipped out of this port. The closing days of last week brought intelligence from Buffalo that the steamer Marion had run short 1,872 bushels of barley, and the steamer Helena 500 bushels of oats, while from Oswego was wired the information that the steamer Helca had run short 800 bushels of barley. All three cargoes were received at the old St. Paul A house, now operated by F. Kraus & Co., and the carriers must look to that firm for redress. Whether anything can be accomplished in this direction, the future must determine. Shortages are said to be the rule rather than the exception in connection with shipments made from the Kraus elevator, but it is only recently that they have assumed mammoth proportions. On a previous trip the steamer Helena took a bulkhead cargo of barley and flax seed from the same elevator. The barley fell short twenty bushels, while the shortage on the flax seed was 200 bushels. A thorough investigation will be pushed in an effort to obtain redress.

The Milwaukee and Eastern Transit Company, which operates a line of boats between this port and St. Joseph, have purchased the old Western Transit Line steamer Fountain City to take the place of the small steamer City of Marquette on the route. Thus the line will hereafter be composed of the steamers City of Fremont and Fountain City. Good judges claim that while both steamers, though old, are no doubt in good condition, they are nevertheless in no way suited to the trade. They are too "long legged," that is, they draw too much water to reach St. Joseph in all sorts of weather. During the present fall a bar has formed across the entrance to St. Joseph harbor, and the water is now so shoal that exit or entrance is impossible except in absolutely calm weather. The present intention of the company managers is to run the steamers all winter, but a few weeks of adverse experience may compel an abandonment of the idea. The City of Fremont has been laid up three weeks now, for repairs upon her boiler mainly.

Owing to a scarcity of coal at Chicago, steamers bound down from that port are compelled to stop at Milwaukee for fuel.

Lake Superior Grain Movement.

Special Correspondence to the MARINE REVIEW.

DULUTH, Minn., Nov. 19—Wheat shipments last week were the largest of the year, reaching 2,796,586 bushels, but even that amount was not as large as expected. From the estimate of vessel agents a week ago it was thought that about 4,000,000 bushels would be loaded out. It seems, however, that the boats did not get around. As nearly as can be learned there are least seventy-five loads still to go out before navigation closes and the charters are not all made yet. On last Tuesday 732,400 bushels were loaded out. This is the biggest day'srecord of shipments out of Duluth. The biggest record for receipts was on last Monday when 807,303 bushels were taken in. Figures for last week and previous weeks were as follows:

	Receipts, bu.	Shipments, bu.
Last week	3,020,381	2,796,586
Previous week	2,779,867	2,358,301
Same week last year	720,346	560,936

The record of the crop year to date is: Receipts 24,093,727 bushels; shipments 18,905,409 bushels. There were in store Monday morning 4,065,491 bushels of wheat, 95,954 bushels of barley and 119,159 bushels of flax.

Report of Experimental Trip,

MADE UPON SCREW STEAMER E. P. WILBUR TO THE BUILDERS, THE GLOBE IRON WORKS COMPANY, CLEVELAND, O.,

[BY GEO. C. SHEPARD.]

In the practice of ship-building upon these waters, designers, owing to the shallow rivers and limited dockage, can not borrow directly from the practice on the coast, but must depend upon their own originiality wherewith to get out vessels to accommodate the peculiar conditions existing, and with the advent of steel in construction, finer lines and the use of high expansive engines, it has become desirable to obtain comprehensive results of actual performances, from these, coefficients by which these performances may be compared with those of vessels considered to be good practice upon deep water. Acting on this line we left Buffalo September 16th, 1889, upon the Lehigh Valley Transportation Company's steamer E. P. Wilbur, prepared to take such observations and make such trials as the regular running of the vessel would permit.

The weather, though not severe, was such as to keep the ship pitching some during nearly all of the out-bound trip; this made testing impossible at times, but on the return trip the weather was more propitious for our work. Going up, the vessel was loaded with only a few hundred tons of package freight and 231 tons fuel, plus the water ballast usually carried under these conditions, of some seven or eight hundred tons, and drew 5 feet 2 inches forward and 13 feet aft. This gave good water for her wheel but presented considerable surface at the bow for the action of the wind. From Chicago to Buffalo the Wilbur carried a miscellaneous load of grain and package freight which load gave her a draft of 15 feet 6 inches aft and 15 feet 2 inches forward.

This vessel was built for the package freight, grain and flour trade between Buffalo and Chicago and was designed to carry big loads with despatch, hence has fair lines. She is built with steel frames covered with soft steel sheathing and is in every way a stiff staunch craft, while the arrangement of masts and cabins is such as to present a very attractive appearance.

Dimensions of ship:

290 feet, 2 inches keel.
306 feet, 6 inches over all.
25 feet, 6 inches depth of hold.
40 feet molded beam.
Mean draft of water, 9 feet, 1 inch, 15 feet, 4 inches.
Displacement, net tons, 2,410, 4,300.
Immersed midship section, 354 square feet, 603 square feet.
Co-efficient of fineness, .731, .773.
Co-efficient of water lines, .750 .786.

The engines, well toward amidships, are of the ordinary triple expansion type, with high pressure cylinder forward and low pressure cylinder aft, all connected by belts in cylinder castings. The action of the steam in the system is controlled by single "D" valves actuated by eccentrics directly through the Stephenson link. These links are shifted by a small engine, whose cross-head is connected directly to the reverse shaft. The points of cut-off in the cylinders are fixed by notches in a small quadrant, these notches engaging lugs on cross-head of reverse engine, thereby fixing the position of the links. The crank shaft is built up of three pieces bolted together at angles of 120 degrees from each other and the crank of low pressure engine leads, followed by that of middle pressure and lastly by that of high pressure engine. The shaft is 12 inches in diameter and 12 inches in the bearings and the thrust is taken on three collars presenting a surface of 603 square inches.

The condensing apparatus consists of a large jet condenser and an air pump, both bolted to port frames of engines. The air pump gets its motion from the cross-head of middle engine. To extensions on either side of air pump cross-head are attached two 3½ inch feed pumps, one bilge and one cooler pump; besides these pumps and auxiliary to engine is a small pony pump for general use and a larger duplex pump for emptying ballast tanks. Dimensions of engines:

Cylinders, 24 inches, 38 inches and 61 inches diameter, by 42 inches stroke.
Clearances per cent. or piston displacement:
H. P., .09; M. P., .078; L. P., .057.
Air pump, 24 inches diameter by 21 inches stroke.
Weight of engine and shafting, 140.35 tons

The boilers, three in number, are placed forward of the engine fore and aft, in a line across the hold of vessel. They are of the Scotch pattern with three of the Fox corrugated flues in each boiler. Inspectors allowed 164 pounds steam.

Dimensions of boilers:

11 feet, 10 inches diameter by 12 feet long.
Furnaces 38 inches diameter with grates 6 feet long.
Total water heating surface, 5574 square feet.
Total grate surface, 162 square feet.
Ratio, 34.4.
Weight, (empty), 116.21 tons.
Boilers are provided with horizontal steam drum.

The wheel is sectional of cast iron after the style of a Griffiths, and as originally laid out the buckets were built with a pitch of 16 feet, but when this vessel came out her wheel had 17 feet pitch. Later, when the engineer fitted her out last spring he still further increased the pitch by moving the flange of the blade around 5-16 inch giving her a uniform pitch of 18.07 feet; diameter 14 feet, with 60 square feet of bucket surface.

The gases from the three boilers were discharged through one up-take, 7 feet in diameter and 45 feet high from top of grates, and at a point about 20 feet above grates, put in a pyrometer and also draft gauge. Preparatory to this experimental trip encased thermometers were inserted, one in injection pipe and one in hot well; graduated scales were attached to water glasses to read heights thereof. Then the readings of revolution counter, steam and vacuum gauges, thermometers and water glasses were taken every hour by the engineer on watch and thence copied upon printed form by first engineer. On deck, took readings hourly of taffrail log, pyrometer, thermometers, wind, barometer and course. For distances traveled, relied entirely upon ship's log which had been corrected by frequent comparison to measured distances upon courses. Many of the readings taken are not needed in the present instance so have taken those presenting the greatest diversity and combined extracts of the two logs to form one as found in the following table:

No.	Time.	Notch of Engine	Register Reading	Rev. Per Min.	Steam Gauge.	Pyrometer.	Wind.	Log Reading.	Miles Per Hour.	App. Slip. %
1	11.50PM 16	.....	.....	.....	.....	Left	Buffalo	Light.	.....	
10	4.00PM 18	3d, ⅔ Thr'tle	194,360	79.1	153	640	.....	289.4	14.04	.133
11	6.00PM 18	"	204,020	80.5	155	610	Abeam.	314.3	14.33	.129
12	7.00PM 18	2d	208,690	77.8	140	620	Ahead.	326.	13.46	.154
13	8.00PM 18	2d	213,290	76.6	140	565	Ahead.	337.7	13.46	.141
14	9.00PM 18	2d	217,900	76.8	135	.....	Abeam.	350.	14.15	.099
18	10.00AM 19	2d	278,790	77.	155	640	Ahead.	507.3	14.04	.185
19	11.00AM 19	3d	283,695	81.7	145	620	L. Ahead	520.8	15.54	.070
20	12.00M. 19	3d	288,520	80.4	135	625	Ahead.	533.8	14.97	.089
28	2.50PM 21	2d	1,030	.....	155	Left	Chicago.	.....	.....	.....
36	3.00PM 22	2d	111,450	73.	143	580	None.	275.5	12.54	.160
37	4.00PM 22	2d	115,770	72.	138	640	None.	286.5	12.66	.140
38	5.00PM 22	2d	120,030	71.	135	590	Ahead.	297.5	12.66	.128
43	9.00AM 23	2d	193,040	77.	158	680	.....	480.8	13.81	.123
44	10.00AM 23	2d	197,420	73.	160	670	.....	492.1	13.	.129
45	9.00PM 23	3d	236,730	.....	152	660	.....	.....	.....	.....
46	10.00PM 23	3d	241,417	.....	143	660	Ahead.	5.3	.....	.....
47	11.00PM 23	3d	246,080	77.7	140	660	Ahead.	17.4	13.92	.124
48	12.00PM 23	3d	250,750	77.8	150	.....	L. Ahead	29.6	14.04	.118
50	9.00AM 24	.....	292,310	79.8	150	660	L. Ahead	134.8	13.58	.167
51	10.00AM 24	.....	296,900	76.5	150	650	.....	145.5	13.46	.139
52	11.00AM 24	.....	301,500	76.6	150	665	None.	158.3	13.58	.132
54	1.00PM 24	.....	310,870	79.5	145	640	.....	182.4	14.27	.122

In the preceding table are different speeds made by the vessel in miles per hour, also the revolutions of the engine per minute for the same hour, and now to get a graphic representation of the relation of these elements in their different magnitudes, have plotted them on the following plate (No. I) using the miles per hour speed of vessel, for abcissae and the revolutions per minute for ordinates. Since increasing the draft of water changes the relation between revolutions and speed, have taken points of different drafts with different origins. At all times there was more or less wind and sea to retard motion and otherwise affect the vessel and wheel, and points plotted from data taken under these conditions without eliminating the effect of disturbing influences will not closely follow any law or form a curve. The curves that have been drawn are but the approximate, theoretical curves that might have been drawn had the conditions been perfect. They represent the loci of the mean relation between speed and revolutions.

[TO BE CONTINUED.]

The above is the first of a series of articles which will give the most complete report of a triple expansion marine engine ever made on a lake steamer. Four sets of indicator cards, taken under very different conditions are among the illustrations. Steamship and engine builders and mechanical engineers will be interested. Send $1 for ten issues, which will include the article complete.

Record of Speed and Big Cargoes.

[*Masters or owners are invited to report improvement on this list.*]

Iron ore: Lake Michigan—Maryland, Inter-Ocean Transportation Company, of Milwaukee, 3,322 gross, or 3,737 net tons, Escanaba to South Chicago, draft 16 feet 6 inches; E. C. Pope, Eddy Bros. of Bay City, 3,239 gross, or 3,628 net tons, Escanaba to Buffalo, draft 16 feet. Lake Superior—E. C. Pope, Eddy Bros. of Bay City, 2,828 gross, or 3,167 net tons, Ashland to Lake Erie, draft 14 feet 6 inches.

Grain: E. C. Pope, Eddy Bros. of Bay City, 125,730 bushels of corn, draft 14 feet 8 inches; Western Reserve, Peter Minch, of Cleveland, 112,431 bushels of wheat, Chicago to Buffalo; W. H. Gilcher, J. C. Gilchrist, of Cleveland, 114,982 bushels of corn, Chicago to Buffalo.

Speed: Owego, Union Line, of Buffalo, Buffalo to Chicago, 889 miles, 54 hours and 16 minutes, 16.4 miles an hour; Saranac, Lehigh Valley Line, of Buffalo, Buffalo to Lime-Kilns, 240 miles, 15 hours and 10 minutes, 16 miles an hour.

Iron Mining.

VALUE OF LEADING STOCKS.

Quoted by Chas. H. Potter & Co., No. 104 Superior St. Cleveland, O.

Stocks.	Par Value.	Bid.	Asked.
Cleveland-Cliffs Iron Company	$100 00	$.....	$ 80 00
Champion Iron Company	25 00	.....	76 00
Chandler Iron Company	25 00	40 00	.....
Chicago and Minnesota Ore Company	100 00	.....	.....
Jackson Iron Company	25 00	.....	110 00
Lake Superior Iron Company	25 00	62 00	.....
Minnesota Iron Company	100 00	.....	81 00
Pittsburg Lake Angeline Iron Co	25 00	.....	145 00
Republic Iron Company	25 00	25 00	27 00
Ashland	25 00	.....	.....
Section Thirty-three	25 00	.....	.....
Brotherton	25 00	2 00	2 50

Although it is agreed among investors in iron mining securities that there should be more trading in the market and values should be higher, it is also agreed that the lack of such conditions is due to the same cause that retards preparations on the part of ore companies for next year's sales. The manufacturers of pig iron are still waiting for railway companies to make purchases that will warrant an increase in prices and ore dealers can see no profit in selling ore for next season's delivery at prices that have prevailed since last spring. There is no announcement of dividends as yet from the mining companies, although a division of profits in a few cases is, of course, expected with the close of navigation. Any change for the better will cause preparations for active work at the mines during the winter, and it may be expected also that an encouraging iron market will result in a boom among new properties in Minnesota, but there is still a great doubt as to the future of the Mesaba and other districts of that state, about which there is a great deal of talk. Capt. Thomas Wilson and Mr. M. A. Bradley of Cleveland have close relations with mining men who have given considerable attention to these new districts, but they do not seem greatly enthused over them. While it is true that at the Bewabik and other properties more than 2,000,000 tons of ore has been uncovered in places where the building of but about 75 miles of railway at $14,000 a mile would bring it to Superior or Duluth for shipment, the formation is known to be flat and the ore is thought to be unclean.

Shipments of the Gogebic range mines from Ashland on Nov. 11 (these mines are also shipping from Escanaba and by rail) were as follows: Ashland 247,094 tons, Aurora 81,483, Tilden, No. 2, 5,221, Tilden 23,194, Montreal, south vein 56,133, Palms 32,237, Section 33, Bessemer, 38,576, Carey 92,963, Trezona 15,759, Germania 22,382, Iron Belt 1,506, Mount Hope 100,976, Norrie 242,771, East Norrie 111,165, Comet 10,144, Federal 929, Eureka 12,752, Pabst 83,061, Ruby 913, Sunday Lake 54,419, total 1,233,833 tons. On the same date the Ludington mine had shipped from Gladstone 128,179 tons and the Hamilton 58,022 tons. The output of the Vermillion range, also computed to the 11th, inst., included 491,010 tons from the Minnesota mine, 367,883 tons from the Chandler and 3,049 tons from the Pioneer. Lake shipments from the mines of the Penn Iron Company, now at an end, foot up 195,000 tons while the output of this company for the fiscal year ending Nov. 1, is 232,000 tons. The Badger mine, new property of the Commonwealth company, already shows an output slightly above 70,000 tons and this will be increased by rail shipments that are to continue during the winter. With the close of the season at the Schlesinger mines—Dunn, Crystal Falls, Buffalo, South Buffalo, Queen and Prince of Wales—will show an output of 700,000 tons.

In all parts of the Lake Superior mining region there is evidence of preparations of active work during the winter, in anticipation of heavy shipments in 1892. Operations in and around Ishpeming, where the most important properties are located, are especially active. Iron Ore of that place reports that the Lake Superior company has started a second shaft near the Winthrop mine where new workings were begun a short time ago, and were it not for a delay in receiving machinery ore hoisting would have been begun at the new workings in the east end of the Lake Angeline property. At the No. 1 shaft of the Champion a new lens of ore giving 69 to 70 per cent. in iron has been discovered and although the find is not large it is a great specimen of the high grade mineral of the district. The Iron Cliff Company owning the fee of the Fitch mine has made arrangements with the Fitch company to continue explorations on its leased ground, and at the Saginaw and other mines arrangements are being made for a renewal of operations.

The management of the Ludington mine where large quantities of a high grade of ore for mixture has been mined during the past few years, propose to use a steel tube for the purpose of running dirt from the surface to the bottom of the mine for filling purposes. The distance is 1,500 feet, but the tube will be of 3/8-inch steel and 3 feet in diameter, and will be supplied with openings for the purpose of relief in event of the filling matter becoming clogged.

"Useful Hints to Sea Going Engineers," is the title of a book that will interest engineers. It contains plain hints and gives information how to repair and avoid break-downs, the latter being illustrated by 36 diagrams and 4 plates. It is published by Thomas Reed & Co., Sunderland Eugland. Any engineer sending a year's subscription to the REVIEW and $1 additional will receive a copy.

Among the engravings in the "Menominee Iron Range" by Walter R. Nursey, now in press, are the following: Shaft No. 1 Hamilton mine, Chapin in 1878, fourth level in Ludington mine, Mansfield mine, Dunn mine, with others, making about fifty in all. If you wish a copy, bound in cloth send $1 to the MARINE REVIEW.

The Dunn mine, leading Schlesinger property, will close the season with an increase of about 10,000 tons over shipments of 1890, and it is reported now that in preparation for next season the syndicate proposes a renewal of operations at the Armenia mine, where 75,000 tons of ore was produced during 1888 and 1889.

Tonnage of the World.

The Bureau Veritas, 1891-1892 edition, French register of shipping, reports for the world a total of 10,103 steam vessels of a net tonnage of 100 tons and greater. These steam vessels represent a gross tonnage of 13,805,028 tons and a net tonnage of 8,872,394 tons. The number of sailing vessels in the world, according to the same source, is 31,666 of a collective net tonnage of 10,217,909. By adding the net tonnage of sailing vessels to the net tonnage of steam vessels the United States occupies second place among the nations of the world. The English flag is represented by 5,471 steamers of a gross tonnage of 8,536,994 tons, corresponding to 5,369,952 net tons, and by 9,751 sailing vessels of an aggregate net tonnage of 3,503,524 tons. Next comes the American flag with 456 steam vessels of 598,847 gross tons and 417,138 net tons, and 3,504 sailing ships of 1,519,114 net tons. The Norwegian flag follows with 3,419 sailing vessels of 1,393,481 net tons, and 440 steamers of 310,624 gross tons and 221,202 net tons. Then comes Germany with 761 steam vessels of 1,083,307 gross tons and 762,195 net tons, and 1,480 sailers of 654,147 net tons. Next in order is the French flag with 488 steamers of 843,486 gross tons and 500,516 net tons, and 1,573 sailing ships of 286,114 net tons. Next is Italy with 206 ships of steam of 313,306 gross tons and 199,153 net tons, and 2,010 sailing vessels of 586,684 net tons.

Great Britain now owns 62 per cent. of the steam tonnage of the world and 45.5 per cent. of the known tonnage of the world, both steam and sail.

MARINE REVIEW.

DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

JOHN M. MULROONEY, ... } PROPRIETORS.
F. M. BARTON, ... }

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THROUGH the annual report of Gen. Casey, chief of army engineers, something is learned of the recommendations of Gen. Poe in charge of the most important improvements in the rivers between Lake Superior and Lake Erie. The vessel owners have reason to be thankful for the position taken by Gen. Poe with regard to Grosse pointe and the shallow places in the St. Mary's river He asks for $2,000,000 to be used during the coming year on the new St. Mary's Falls canal lock and $500,000 for the Hay lake improvements, these sums to be expended, of course, in accordance with the act of congress providing for the whole work. The Hay lake appropriation, he says, should be granted with the proviso that any portion not required for the Hay lake channel could be immediately expended elsewhere between Lake Superior and Lake Huron at places where excavations are needed to obtain the navigable depth of 20 feet. Immediate relief in this way is just what is wanted by the vessel interests, and Gen. Poe, following the same line of argument regarding Grosse pointe, displays an understanding of the situation that is fully in accord with the present needs of navigation. "The number of vessels annually crossing these flats is enormous," he says, "and to insure a thoroughly satisfactory result a channel 800 feet wide and nearly five and a half miles long should be obtained at whatever cost. To accomplish valuable results a large appropriation will be required at first, and unless this be granted the results will be unsatisfactory and the eventual cost will be greatly increased. With $300,000 available a narrow channel of the proposed depth can be opened and will afford immediate though insufficient relief. The width can subsequently be increased to such an extent as may be necessary." For the completion of the St. Clair canal project, 18 feet depth, $196,230 is asked and this entire amount can profitably be expended during the coming year, and for the removal of shoals between the city of Detroit and Lake Erie an estimate of $50,000 is submitted.

A SHORT time ago the REVIEW, on an occasion presenting itself, said that only in rare instances can marine publications of New York and other distant places give any return for advertising from shipbuilders or others doing business on the lakes. There was no jealousy in the remark, as it was made in connection with a complimentary notice to the Marine Journal, a high class New York trade publication that recognizes a good business principle in not seeking advertising where it is not intended to give full return for it. The cap seemed to fit a less scrupulous publication, Seaboard, which immediately launched out with a cry of "sour grapes" and a parade of its alleged influence among lake interests, "as shown by a large and growing advertising patronage from lake shipbuilders." We have no desire to burden readers of the REVIEW at any time with personal controversies, but in this matter there is some information involved that may be of assistance to shipbuilders and others on the lakes from whom Seaboard evidently seeks to force a patronage. Advertisements of F. W. Wheeler & Co. of West Bay City, and the Globe Iron Works Company and Cleveland Ship Building Company of Cleveland have been running in Seaboard for a long time past. They were taken from a defunct marine paper of Detroit and have been ordered out several times. Mr. F. W. Wheeler, president of the Wheeler company, Mr. Luther Allen, secretary of the Globe company and William M. Fitch, secretary of the Cleveland Ship Building Company, all say that in answer to orders to remove the advertisements, on the claim that they were of no service whatever, they received letters threatening them with legal proceedings for collection. The letters were either thrown into the waste basket or turned over to the legal representatives of the shipbuilders, but the advertisements are still running. This is the "influence" that talks of "high grapes."

NAVIGATION on the lakes is ended when the boats stop running. They have been known to arrive down from Lake Superior as late as Christmas day. Last year, regular insurance expired at noon, Nov. 30. This year, regular insurance does not expire on the better class of steamers till Dec. 5. For this reason the action of the light-house board in ordering that all lights be kept burning and that the light vessels and iron buoys be continued on their stations as near to the close of navigation as is prudent to do so without injury or loss, is highly commendable.

IT is probable that the underwriters did not figure on high fall rates that would tempt vessels to run well into Christmas, if possible, when they included in the tariff last spring a provision allowing steamers valued at $75,000 and over to run to noon Dec. 5 without extra charge on the season's policy. In the competition for business this extension of five days was even granted to some steamers valued at less than $75,000. The outlook at that time was, however, very blue for the vessel interests.

Congressman Chipman on the Convention.

EDITOR MARINE REVIEW: My reason for preferring Washington for the place of meeting of the contemplated marine convention, to discuss matters concerning the interests of the Northwest, and especially the deep water navigation of the Great Lakes, is based on the fact that delegates will meet there all the representatives of the lake states, all the committees of Congress whose duties affect questions of commerce and river and harbor improvements, and all government officials whose advice or assistance may be needed by the convention.

If the convention had been called at an earlier date, I would have favored another point, but it is hopeless to expect any considerable number of senators and representatives to leave their duties after Congress meets and go to a distant city to attend the convention. Besides that, the committees on commerce; rivers and harbors, etc., would not as a body attend even on the strongest invitation. We can meet them all in Washington. In addition to this I am certain that the commercial bodies will select men of brains and experience as delegates, and I hope for great results from the personal contact of these delegates with members of both houses of Congress.

J. LOGAN CHIPMAN.

Detroit, Mich., Nov. 15.

Plan for Wrecking the Pewabic.

EDITOR MARINE REVIEW: I have noticed by the papers that a diver lost his life in trying to do some wrecking work on the propeller Pewabic, which was lost off Thunder bay over twenty years ago. Would the following not be a good plan to adopt in wrecking the Pewabic? Let the divers rnn heavy wire cables through the hawse pipes and make the end of one of them fast to the Samson post and the end of the other fast to the mast below the hatch. Then get four or five powerful tugs, two or three fast to the upper end of each cable, and start for shore. I think the tugs would drag her along the bottom into shoal water, as the strain exerted by the tugs would have a lifting as well as forward motion. Then it would be easy to wreck her, without running the risk of losing the lives of divers going into the hold.

P. MCCANN.

ST. IGNACE, Mich., Nov. 11, 1891.

Official Numbers and Tonnage.

The bureau of navigation, W. W. Bates commissioner, assigned official numbers to the following lake vessels during the week ending Nov. 14: Steam—Edward Buckley, Grand Haven, 414.88 tons gross, 313.46 net, No. 136,252; F. W. Bacon, Erie, 37.05 tons gross, 24.63 net, No. 120,880; Ivy M. Leathern, Milwaukee, 50.72 tons gross, 25.36 net, No 100,509. Sail—Grayling, Cleveland, 6.88 tons gross, 6.54 net, No. 86,185. Unrigged—Dr. S. H. Jameson, Buffalo, 124.51 tons gross, 118.29 net, No. 35,516; H. E. Miller, Buffalo, 124.51 tons gross, 118.29 net, No. 42,729.

Buffalo Opposed to a Waterways' Convention.

The Buffalo managers of the Lake Carriers' Association a few days ago adopted a resolution adverse to the holding of a waterways' convention next month, and they have asked for a vote on the resolution from managers in other lake cities. They advance the opinion that appropriations for a 20-foot channel throughout the lakes can be secured without agitation in a gathering of all lake interests, and express fear that talk of an outlet to the seaboard at this time may jeopardise the chances of securing appropriations for projects now under way. Buffalo seems late with this opposition, when it is considered that the convention has been talked of in every port on the lakes for three months past. Cleveland managers of the Lake Carriers' Association favor plans for the convention and will so inform the Buffalo officers, and it is probable that managers in other lake cities, who have already committed themselves to the convention, will do likewise. They will do so on the claim that appropriations from Congress can not be secured by remaining at home and simply asking for them, as vessel owners have repeatedly found to their sorrow in the past. All that can or will be asked of Congress in connection with the proposed outlet to the seaboard is the appointment of a commission of engineers for examination of the subject. Congress always proceeds in this way with big undertakings, and no harm can come from a request for the appointment of such a commission. But even in taking such a mild position there is a great diversity of interests to be heard from, including Buffalo's view of the subject of a radical or moderate enlargement of the Erie canal, and no harm can come from hearing these different views of the question.

Famous St. Paul Case—Supreme Court Decision.

On the night of Nov. 10, 1883, the propeller St. Paul, bound for Lake Superior, was when near Detour found to be on fire. It being impossible to extinguish the fire by other means the propeller was scuttled. Subsequently she was raised and brought to Detroit for repair. About the 20th. of the same month while discharging cargo preparatory to going into dry dock, the fire again broke out and she was again sunk in Detroit river. She was again raised and put into dry dock. Repairs were made, which together with incidental small expenses, made the actual direct damage by fire over $15,000, without taking into account salvage expenses of raising her the second time, all which expenses amounted to the further sum of $15,000. The vessel had marine insurance excluding any and all loss caused by or in consequence of fire, and also had $40,000 straight fire insurance.

The question arose whether either and which set of underwriters was liable for the expense of raising and saving the vessel, amounting as already stated to $15,000. The owner in order to promptly realize money to make the repairs settled with the fire insurance companies for the item of direct fire damage and always claimed that no settlement or arrangement was made covering the salvage expenses. Under legal advice he brought suit in the United States circuit court at Detroit against the fire insurance companies for the loss. The companies denied all liability, and further claimed that this feature of the loss was included in the settlement made by the owner in New York and not covered by certain "compromise receipts" in full which he had signed in collecting the direct fire loss.

On trial before Justice (then District Judge) Brown and a jury, the owner recovered against the fire companies, the judge charging that under the circumstances of that case the fire companies were liable for this species of damage and submitting to them the question whether there had in fact been a compromise settlement covering and including these claims. This verdict was set aside by Justice Matthews and a new trial granted. On the next trial before Judge Brown and a jury the judge, in deference to Justice Matthews' opinion, directed the jury to find for the defendant companies. Motion for new trial was argued before Circuit Judge Jackson, who granted a motion and directed a new trial. On this next trial the jury disagreed. This necessitated still another trial in which the owner again succeeded and obtained a verdict. The questions of law involved were then certified by reason of division of opinion to the supreme court of the United States, where on Monday last the judgment in favor of the owner was affirmed, and the owner of the boat will at last receive his money.

John W. Wickham, Jr., of Huron, O., is managing owner of the St. Paul. In the various trials of this much litigated case there appeared for Mr. Wickham as council, though not all in any one case, G. V. N. Lohrop, the present Judge Swan, Don Dickinson, Moore & Canfield of Detroit, and H. D. Goulder of Cleveland. For the insurance companies Blodgett & Patchen, Judge Walker and the late Judge Marsden, all of Detroit, appeared

Wrecks and Heavy Losses.

The schooner Montcalm, lost at Selkirk, Ont., Monday, was valued at $5,000. She was owned by the Rochester Transportation Company of Buffalo rated B1 and measured 282 tons.

Capt. Estelle of Chicago lost his life with two others of a crew of seven on his schooner Hattie Estelle, at Manistee on Tuesday. The boat, laden with wheat from Chicago, was dashed against Manistee piers and is a total loss. The boat rated A2, was valued at $5,500 and registered 295 tons.

Notice to Mariners.

Notice is given that on the opening of navigation in 1892, a fixed white light of the fourth order will be exhibited from the temporary structure recently erected on the extremity of Seul Choix pointe, northern end of Lake Michigan. The light will illuminate 270° of the horizon extending from N. by E. through eastward and southward to W. by N. The light may be seen, in clear weather, from the deck of a vessel 10 feet above the lake, 14 statute miles.

News Notes.

Cleveland's life saving crew is to have a ball at Lang's hall on Dec. 17. It is the custom of the crew to give an entertainment of this kind at the close of navigation and they are deserving of recognition even from those who cannot join in the festivities. The young men in this humane calling are poorly paid for their services.

McDougall has contracted with the Marinette Iron Works, a prosperous machinery concern of West Duluth, for a triple expansion engine. Colgate Hoyt and other leaders in the barge company have gone to Puget sound to examine northwestern properties of the syndicate and to meet the Wetmore on arrival at the new barge town. It is claimed that work will begin on the passenger whaleback immediately after New Years.

According to reports furnished the American Manufacturer of Pittsburgh, the weekly production of pig iron on Nov. 1 was 192,743 tons, exceeding the production of Oct. 1 by 10,925 tons, and exceeding the production of Nov. 1, 1890, by 12,288 tons. The production of bituminous iron is some 14,000 tons a week greater than ever shown before. The country has been producing since July 1, 1891, at the rate of 178,199 tons; the rate of production for a corresponding period of 1890 was 173,427 gross tons.

The American Ship Windlass Company, Providence, R. I., is erecting a large building 68 by 112 feet and changing and altering other parts of its plant to correspond. This new building will be one story with a monitor roof and a 20-ton electric traveling crane. The company will also put in a 72-inch engine lathe, 30 feet bed, a large hydraulic forcing machine, a large radial drill and various smaller tools. Steam windlasses are being made for the steamer building by the Harlan & Hollingsworth Company, in addition to the two mentioned in the REVIEW Nov. 5, also steam windlasses for the two steamers building by Neafie & Levy at Philadelphia, the two steamers building by F. W. Wheeler & Co., the steamer building by Curtis & Brainard and for the yacht building by the Globe Iron Works Company for Mr. H. M. Hanna.

The North Pabst Mining Company of Ashland, Wis., has been organized with a capital of $200,000. The incorporators are C. N. Cramer, S. W. Tanner, C. J. Coe, P. Lamal and Edward Sother.

Ship-owners and captains will be interested to learn that at the Detroit Boat Works, Detroit, Mich., yawls of all sizes, from 14 to 22 feet in length, are constantly kept in stock and delivered to vessels while passing through the river, or at their dock, day or night.

Around the Lakes.

Damage to the steamer Susan E. Peck from sinking in the Sault river is estimated at $26,000.

Capt James Davidson of West Bay City is building only two wooden steamers. The report that he would build three consorts is denied.

The Howard Towing Association will keep a tug stationed at Port Huron, with full and complete wrecking outfit, steam pump and diver, the balance of the season.

The Anchor Line, owning the propeller Conemaugh, caused the propeller New York to be libeled at Detroit last week in the sum of $70,000 for the sinking of the Conemaugh in Detroit river. Oct. 21.

Fire last week on the docks of all three of the coal companies. at Duluth and Superior—Pioneer, Lehigh and Northwestern—resulted in a loss of about 30,000 tons of coal valued approximately at $100,000.

About 300,000 bushels of Manitoba wheat has been shipped in bond from Duluth to the seaboard by way of Buffalo, and it is estimated that this amount will be increased to something more than 500,000 bushels before the season closes. A recent ruling of the treasury department sanctions shipments in this way.

Wheeler & Co. of West Bay City are putting new compound engines into the Lora and Ossifrage and both are receiving additional boiler capacity. The Ossifrage will be lengthened thirty feet during the winter, and it is said that next season both boats will be put on the route between Benton Harbor and Chicago in competition with the City of Chicago.

Wages of some of the employers engaged in the iron plant of F. W. Wheeler & Co., West Bay City, were reduced last week, a cut of 12½ to 25 cents being made all around. About twenty-five of the men refused to return to work at reduced pay and they were discharged, the intention being to fill their places with new men. Competition from shipbuilders at other ports is given as a cause for the reduction.

The New York Commercial Bulletin tells of a clever piece of submarine wrecking performed by the Baxter Wrecking Company of New York. A little more than a month ago the tug boat McCaldin Brothers was sunk in the Hudson, settling down into a hole in the river which was over 150 feet in depth, and entering into the side of a vast mud deposit, almost burying herself. The wrecking company brought the boat to the surface a few days ago, nothwithstanding the great depth of water.

Six O'Connell & Cahill lubricators were fitted on the engines of the steam yacht Wadena before she left Cleveland for the Atlantic. One was put on subject to approval, with provisions that others should be shipped to the coast, but it worked so satisfactorily that the others were ordered at once. Three Minnesota boats, the C. B. Lockwood, Pontiac and several other steamers have been supplied. The Continental Machine Company is local agent for the lubricator.

The Polson Iron Works of Owen Sound, Ont., a few days ago launched a cruiser for the Canadian government. The boat is named Constance and is 125 feet long, 19 feet 8 inches beam, and 11 feet 3 inches depth of hold. Her draught is 9 feet 6 inches. The compound vertical engines have cylinders 18 and 36 inches in diameter, with a 24 inch stroke. The boilers are 10 feet 9 inches in diameter and 10 feet 6 inches long. They will carry 115 pounds pressure. There are two masts, carrying a schooner rig, ane she will mount three guns. The stern is modeled after the style of the British man-of-war.

In General

The death of Edward Y. Townsend, late president of the Cambria Iron Company of Johnstown, Pa., is announced from Philadelphia.

From Muskegon, Mich., large quantities of lumber are moved to Chicago by lake, rail shipments being very light. Lake shipments from this port to Nov. 1, which is virtually the close of the season, were as follows: Lumber 199,606,000 feet, shingles 9,110,000, slabs 14,778, lath 13,583,000.

Homor J. Carr, whose contributions to the REVIEW from Chicago each week are appreciated in different parts of the lakes, has a very interesting article in last Sunday's issue of the Chicago Inter Ocean on "Kinks in Marine Law." The article explains in a simple way such features in admiralty as general average, limitation of liability and insurance against collision liability.

Hydraulic hoists for taking ashes from the stokeholds are a late improvement in the outfit of modern British built vessels. It is claimed that they can be worked more economically than steam hoists and with less trouble.

"I do not think" says a prominent lake engineer "there is a steamboat on the entire chain of lakes that can make more steam than she can use. That being the case it is, of course, easy enough to understand why some of the steel boats having large boilers run away from their rivals, although the difference in engines is insignificant. The size of boilers will be increased in most new steamers."

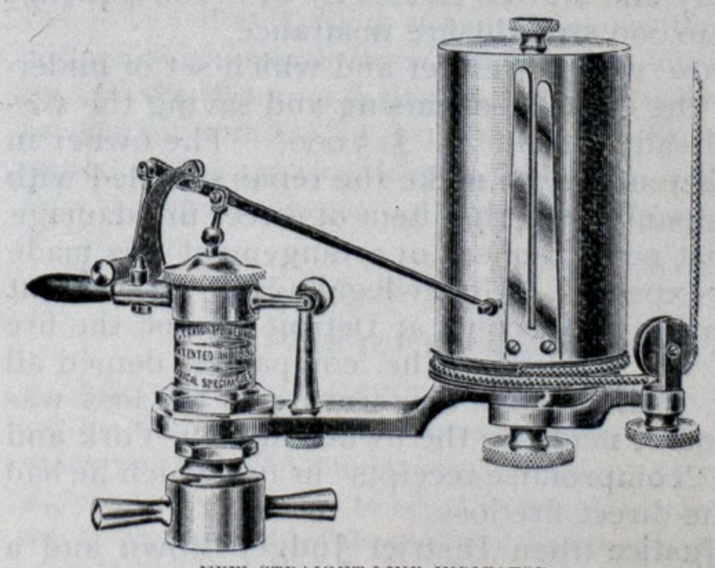
A steamer that can be propelled on land by means of its own engine has just been constructed in Sweden. It is intended for traffic on two lakes separated by a strip of land, on which rails have been laid, so that the steamer can run itself across from one lake to the other. At a trial trip the vessel is stated to have fulfilled the tests very well. The engines are 10 horse power, and the boat can accommodate sixty passengers.

The new yacht storage basin which has just been dredged out on the Harlem river for the Gas Engine & Power Company, Morris Heights Station, New York, has acoommodations for thirty or forty yachts, with 12 feet of water at low tide. The company has facilities for handling all repair work on steam yachts and launches, keeping a large force of skilled workmen employed for all the different branches of this work. There is probably no other place in the United States where a man can get his yacht stored and have every detail attended to under the supervision of one concern, the repairing upholstering, painting, revarnishing and all that sort of work. Preparations have been made to build steam yachts from 50 feet upward, as well as any style of craft in this line.

The Straight-Line Indicator.

The use and appreciation of the indicator are nowadays reckoned among the important accomplishments of the successful engineer. The new straight-line indicator, an illustration of which is given herewith, has recently been perfected and put upon the market by Messrs. Hine & Robertson, of No. 45 Cortlandt street, New York city.

The peculiarity of this instrument lies in the simplicity of its parallel motion and in the auxiliary spring by which it is held up to one working surface, thus preventing the appearance of any back-lash. The guiding mechanism for the parallel motion is placed as near the fulcrum as possible, in order to obviate unnecessary movement and to be where the momentum will be the least. For a card of average height a sidewise movement of not more than one-eight of an inch is necessary to oblige the pencil to move in a straight line, and for so light a movement very little mechanism should be sufficient. In this indicator this is accomplised by two rocking surfaces—one attached to an upright and the other permanently fixed on the pencil arm. The one on the upright is made circular, and the other of such form that when the lever rises and falls these two grinding surfaces roll together for a very slight distance, and cause the pencil to move in a perfectly straight line throughout its full range. All that is required of the auxiliary spring is to give it sufficient tension to keep these grinding surfaces in contact while the instrument is running. This may be determined by turning on steam while the drum is stationary and noting whether or not the pencil traverses the same vertical line. This spring is intended also to take up all the play that may appear in the joints, and oblige the pencil always to follow in the same path.



NEW STRAIGHT-LINE INDICATOR.

The first indicator made was subjected to the test of being run continuously nine hours a day on a high speed engine for over a month, and showed no appreciable wear; what there may have been was taken out by the auxiliary spring, and the instrument improved, if anything, by this hard usage. The effect of the auxiliary spring on the main spring is to weaken it. This allowance is made in numbering the spring, and the scale of spring therefore is the net resistance of the two springs. The moving parts of the instrument are claimed to be the lighest weight of any straight-line indicator, and that weight is disposed so near the fulcrum that its little movement makes the momentum very little, and specially adapts it for the highest speeds.

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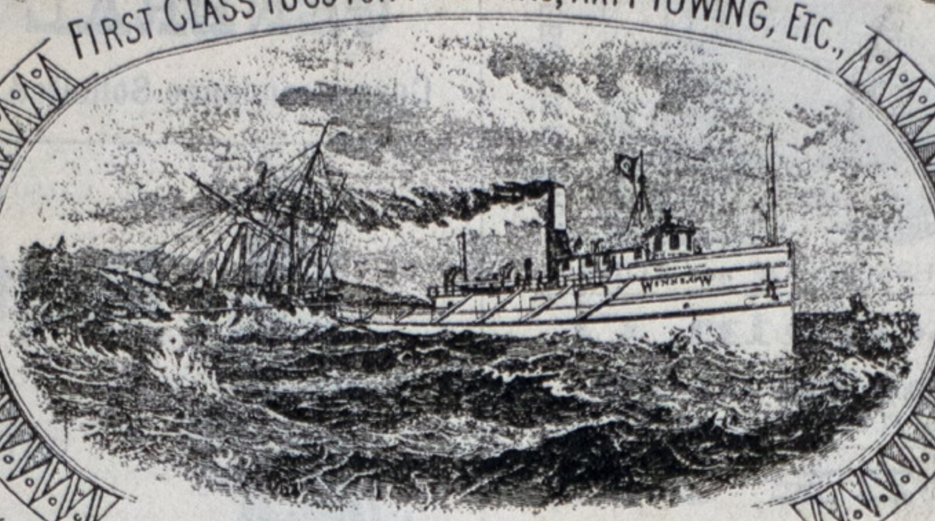

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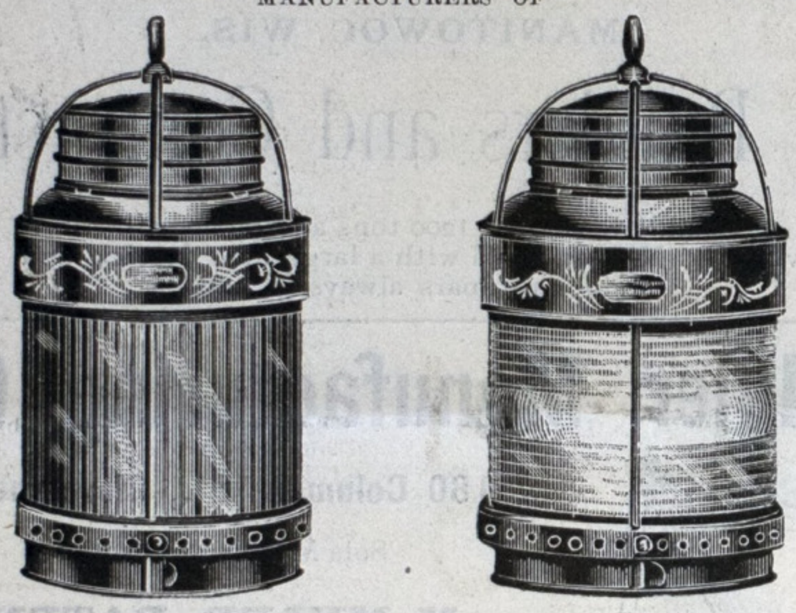

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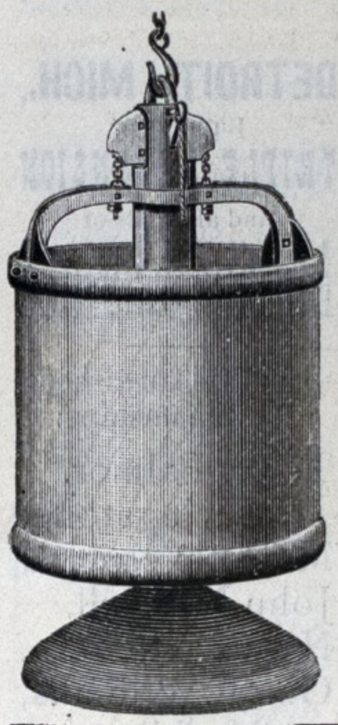

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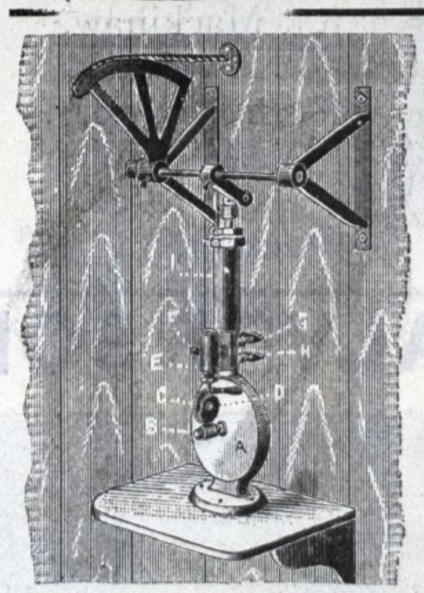

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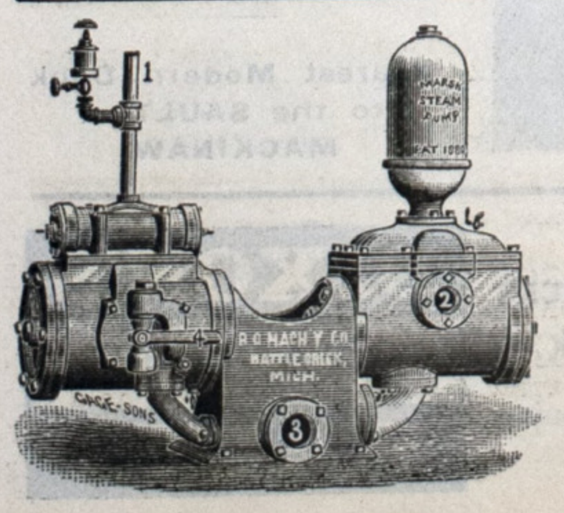

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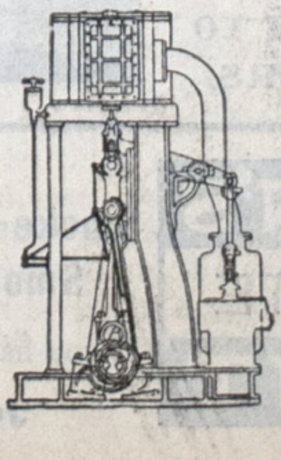

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